Research on Military Logistics based on Big Data

Hao Shi [a], Fei Wan [b] and Xiaokang Lei [c]

Army Logistics University, Chongqing 401331, China.

[a]shihao_hill@outlook.com, [b]373679886@qq.com, [c]xiaokang9177@qq.com

Abstract. This document gives formatting instructions for authors preparing papers for publication. With the arrival of the era of big data, the mature use of cloud computing and data mining technology, the big data mode have been widely applied in logistics. For military logistics, a smart military logistics ecosystem is built combining with big data, cloud computing and data mining. The collection, processing, mining technology of big data in military logistics are introduced. The promoting role of big data on military logistics is emphasized. The fusion method of big data and military logistics is expounding. The basic framework of smart military logistics ecosystem is built, and the application prospect of smart military logistics ecosystem is described.

Keywords: big data; cloud computing; data mining; smart military logistics ecosystem.

1. Introduction

The logistics ecosystem is a complex network system which is composed of the life organism and the related environment. Logistics enterprises, as the main body of the logistics ecosystem, can be divided into support type, functional type and integrated type according to the type of population [1]. These logistics groups rely on information technology and Internet technology into an interdependent, harmonious symbiotic logistics ecosystem. When the vitality of the "big data" is injected into the construction of the logistics ecosystem, the ability of information processing and utilization of logistics enterprises can be improved, which will promote the mutual benefit of the logistics ecosystem [2].
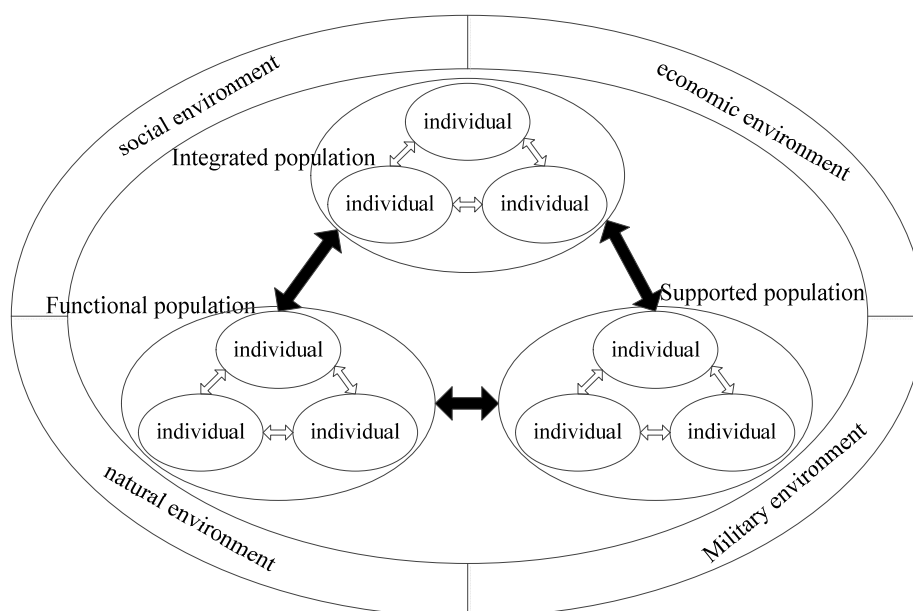

Fig 1. Military logistics ecosystem framework

2. Environmental Synergy of Military Logistics Ecosystem

Military logistics enterprises and the external environment exchange the material, energy and information all the time, for continuous development and evolution, to adapt and change the environment, and then be mutually beneficial symbiosis. The coordination of logistics ecosystem is the inevitable choice in the evolution of logistics ecosystem. Co-evolution is occurring in two or more

with continuous changes of symbiosis, symbiotic and competition between species on [3]. The evolutionary trajectory of these species influences each other, until it reaches the average fitness state, so the cycle continues. Under the function of "big data", the information sharing of the logistics ecosystem has become the main way to coordinate the development between the logistics population and the environment, the logistics population and the logistics enterprise [4]. Therefore, the logistics ecosystem cooperative means to make full use of logistics ecosystem resources, cooperate with each other in shared value creation, make the logistics activities in accordance with the economic environment, social environment, natural environment and military environment, to maximize the rational organization of logistics ecosystem, so that the logistics activities in harmony with the surrounding in order to achieve the sustainable development of the environment.

2.1 Coordination between Logistics Population and Social Environment

The social environment mainly refers to the subject of military logistics and survival is closely related to the policies and regulations, technological achievements, rules and regulations, trade rules and cultural environment factors. The coordination between the military logistics enterprise population and the social environment is the coordination of the logistics enterprises and the government, military and trade associations. The formulation of government policy tilt, army doctrine, industry rules to promote military logistics enterprise population rapid and orderly development, benign evolution, to expand the military logistics enterprise population and individual scale and system of government, army doctrine, industry rules put forward higher requirements, to promote its continuous improvement. This weapon test best tool to the laws, regulations and rules of rationality and validity is the "big data", through the evaluation of the logistics enterprise change and survival state of military logistics in the ecological system, as the government and military authorities timely understanding of the logistics industry and the adjustment of policies and regulations to provide convenience.

2.2 Coordination between Logistics Population and Economic Environment.

The economic environment is mainly the economic development level, market growth rate, market share and potential entrants. The synergy between the military logistics enterprises and the economic environment is the cooperation between the logistics enterprises and other market players. Big data makes the relationship between the various groups more closely, while creating a way of survival between the population value creation. The population in the logistics ecosystem based on big data in the service standards and co concept consensus, military procurement platform will take the initiative to strengthen the supplier and logistics service quality supervision and supervision units of military service feedback; military logistics enterprises and supply businesses will ensure the goods of high quality and consciousness efficient delivery of military units; military units will be evaluated more objectively to accept the service, the realization of desire will promote the co evolution of the logistics ecosystem and realize the value of creating a shared value.

2.3 Coordination between Logistics Population and Natural Environment

The natural environment mainly refers to the environmental factors such as the stock of resources and environmental carrying capacity. The synergy between the military logistics population and the natural environment is the coordination of the development of the military logistics enterprises and the natural resources and the natural environment capacity. Use of "big data" can be innovative ways to optimize the allocation of resources, efficient and reasonable utilization of fine resources, change the extensive development of military logistics industry situation, the logistics population on the road of sustainable development, the realization of Green Military Logistics Bureau, sharing, open face.

2.4 Coordination between Logistics Population and Military Environment

The military environment refers to the military depot distribution, military unit demand, military logistics equipment state, military warehouse inventory level, military transport capacity, military emergency capability and so on. "Big data" is used for peacetime and wartime military logistics

decision to play a decisive role. The acute and reliability of military logistics must require the agility of the decision and the diversity of the program. It is necessary to use the technology of large data mining, assistant decision-making, intelligent control, precise planning and so on.

3. The Population Coordination of Military Logistics Ecosystem

According to the role of military logistics activities, the military logistics enterprises can be divided into support, function and integration type. Functional population is the direct implementation of logistics activities, the process is divided into transportation, warehousing, packaging, circulation processing, loading and unloading, information management and logistics management and other logistics links. Support the population is to provide the necessary software and hardware support for the logistics activities, the population includes logistics equipment manufacturers, software developers, logistics technology logistics service consultant, business platform, logistics information network of logistics financial service providers and logistics training service providers and other species. Logistics enterprise integrated population is mainly for the logistics service providers to provide integrated logistics solutions, and as much as possible the joint function of the relevant enterprises, efficient customer service requirements to complete the logistics.

3.1 Coordination Among Logistics Populations

Functional logistics enterprises are the executor to carry out logistics activities, supporting logistics enterprises to provide hardware and software support for the function of enterprise business activities, integrated logistics enterprise is to provide a complete logistics service solution for customers in the basic function of enterprise, the 3 types of logistics enterprise population complementary dependent and indispensable. Firstly, the coordination between the support logistics enterprises and the logistics enterprises. Support logistics enterprises should be based on the development of the logistics ecosystem for the cultivation of more suitable logistics equipment manufacturing standards, the development of more efficient logistics technology, more skilled logistics personnel, to provide professional logistics consulting services for the functional logistics enterprise logistics activities to lay the foundation for population. At this point, the precise analysis and prediction ability of big data can meet the needs of the support group for real-time dynamic monitoring of the change of logistics function enterprise demand. The second is the functional logistics enterprise population and integrated logistics enterprise population collaboration between functional logistics enterprise population is the main development of logistics business, actively cooperate with the implementation of integrated logistics must rely on functional logistics enterprise population, due to the dynamic configuration of resources of big data makes the logistics integrator for functional logistics enterprise allocation more reasonable, let the logistics ecosystem species cooperation is more diversified, high value.
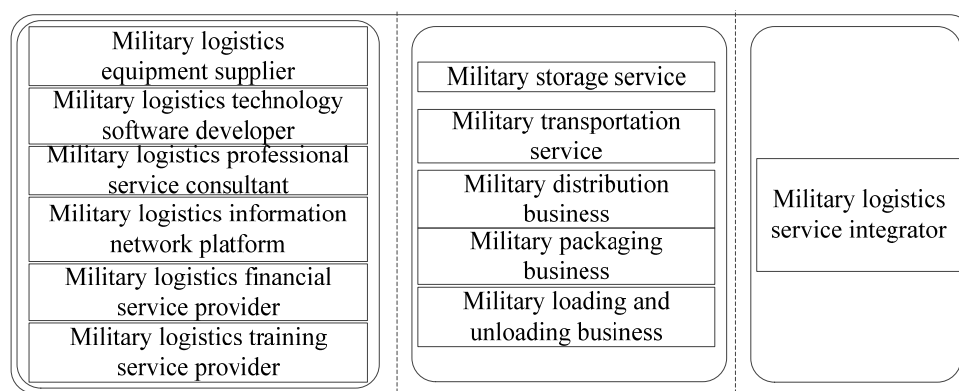

Fig 2. Coordination among military logistics populations

3.2 Coordination Among Logistics Enterprises

The coordination among different species of the same type of logistics population is the basis of the coordination among logistics populations. The functional logistics population as an example, a complete set of logistics services including transportation, warehousing, packaging, handling, distribution processing, logistics management and logistics information communication links, any logistics companies are unable to complete the customer service demand alone. Therefore, the enterprise must realize the collaborative communication and transportation warehousing enterprises, to ensure that the cargo quantity and delivery time will not bring trouble to the warehousing enterprises, the delivery of goods and packaging materials and forms to meet the process of transportation efficiency and safety requirements; warehousing enterprises to realize collaborative communication and distribution enterprises, in order to ensure adequate storage space and can realize the timely delivery of goods; transportation enterprises and storage enterprises to realize the collaborative communication and freight forwarding enterprise, in order to continuously expand the scope of business, work together to create and share a greater market share may provide. In other types of logistics population, the cooperation and cooperation between different species is roughly the same. The most important thing is to collect, analyze, share and communicate information. Each species in the logistics ecosystem in the collected data and information integration analysis, and the use of "non-relational data big data analysis techniques to optimize their business processes, strengthen cooperation, to achieve the overall optimization.
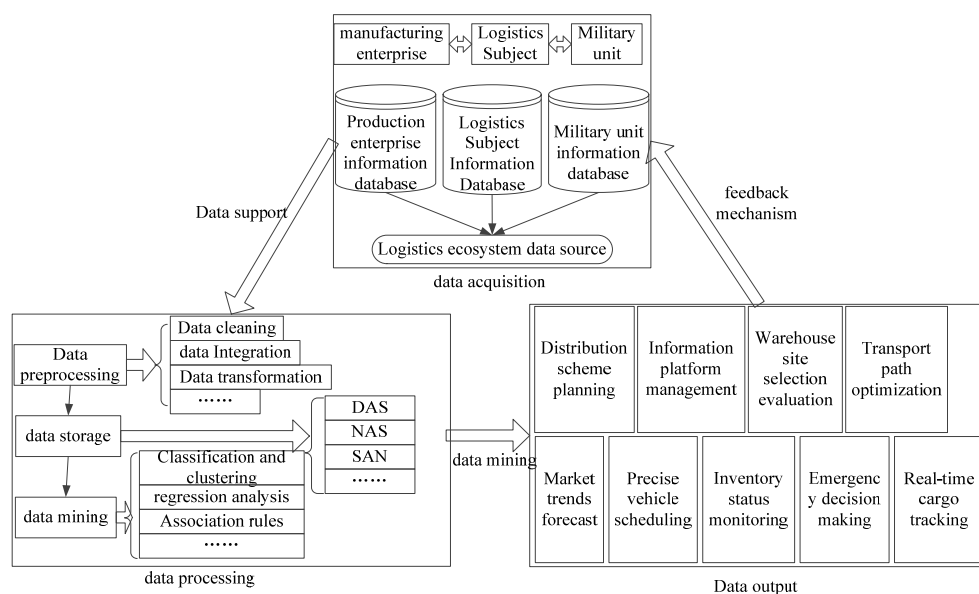

Fig 3. Coordination among species in military logistics (functional species)

3.3 Coordination Among Logistics Units

Logistics within population collaborative logistics enterprises are of the same nature between individuals of mutualism and survival of the fittest. To transport enterprises, for example, the same as the transport business, but some of the water transport for a living, and some rail transport based; and some long-distance transport based, and some are mainly based on the city transport. Each type of transport enterprises has their own unique competitive advantages, and occupy a unique niche". These different transport companies seem sorry but they are not opposites are inseparable, but by the joint operation way to expand business. In the process of logistics operation, the data is the foundation to support its effectiveness. The advantage of "big data" on data processing creates the conditions for the establishment of collaborative logistics. Through the collection of customers, suppliers, business inventory, transportation routes, traffic conditions, the logistics company and weather information, to integrate the analysis form the best scheme to ensure timely delivery safety, establish cooperation and benefit sharing system, promoting healthy competition in the enterprise logistics in ecosystem.

4. Data Mining of Military Logistics Ecosystem

Military logistics and military logistics data acquisition and data mining system, from the military logistics and military logistics collaborative species between individuals between cooperative and collaborative military logistics and military logistics coordination between population and environment in data collection and analysis of data, similar to the complete ecological system evolution process, implementation of natural selection, survival of the fittest, the survival of the fittest[5].
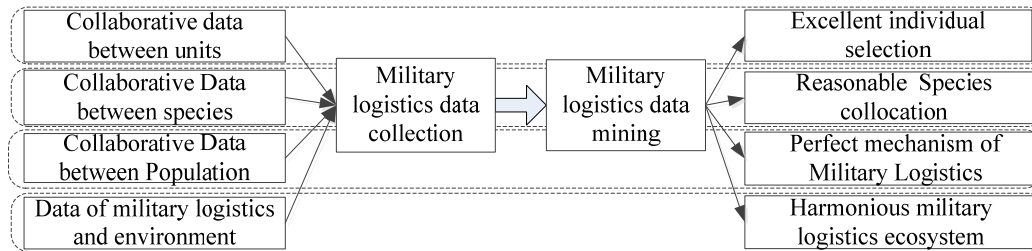
Fig 4. Mining model of military logistics ecosystem

4.1 Excellent Individual Selection of Military Logistics

The internal screening with the nature of the military logistics enterprise, follow the natural selection, survival of the fittest principle, produced by collecting and mining data in the collaborative process, making individuals more competitive, more can adapt to the change of environment, it can meet the needs of customers, improve the ability of enterprises to survive.

4.2 Reasonable Enterprise Matching of Military Logistics

The division of labor within a military logistics enterprise is based on the different functions of each other. Through business orders with the cooperation and exchange of information of each function part, acquisition and data mining, can realize the optimization of business processes, the rational allocation of resources, demand forecast, plan control, accurate division of scientific collocation, improve the population's execution.

4.3 Perfect Population Mechanism of Military Logistics

The military logistics coordination and cooperation among populations, according to the division of tasks, characteristic functions and roles of population, the population of logistics collecting and mining and related population data, reasonable strategic planning, accurate implementation of performance evaluation, scientific intelligent decision, improve the cooperation mechanism of military logistics among populations.

4.4 Harmonious Ecosystem of Military Logistics

Military logistics system to conform to the natural ecological system principle, ongoing internal and external energy, material and information exchange, will dig out all levels of data acquisition and process, complete the brutal survival of the fittest in their respective levels, will filter out the logistics of the main military logistics mode and scientific, advanced and efficient the military logistics system, to achieve self-perfection and harmony, become intelligent ecosystem wisdom, independently and thinking.

5. Intelligent Military Logistics Ecosystem Information Platform Construction

Mining technology and sensor technology integrated use of network technology and information technology, data, realize intelligent control, military logistics and military logistics agile decision intelligence platform system planning, accurate evaluation, self-adjustment and harmonious evolution, the wisdom of the military logistics system is based on military logistics ecosystem on the comprehensive use of big data technology, make the whole the ecological system has self-

consciousness, system of sustainable development of wisdom, independently and thinking, mainly divided into four levels: the support layer, data layer, function layer and application layer[6].
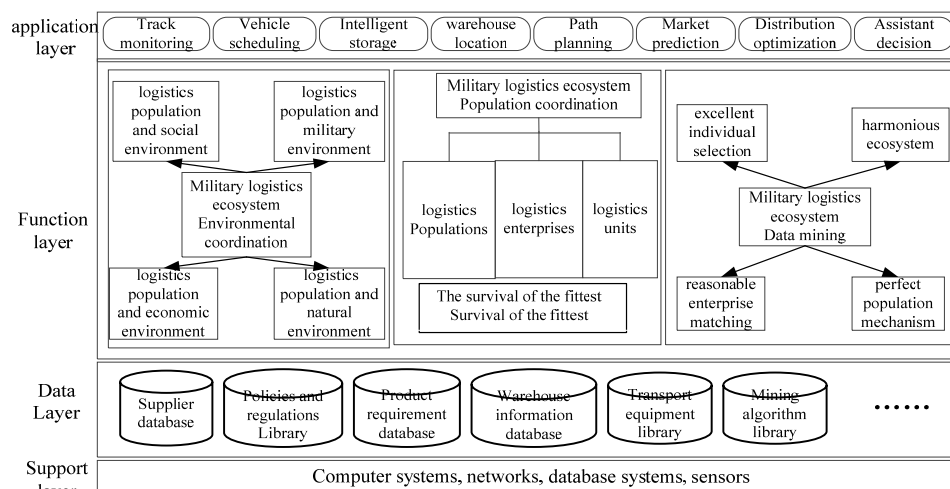

Fig 5. Intelligent military logistics information system platform architecture

5.1 Support Layer

Includes the core technology underlying application, such as computer technology, network technology, database technology and sensor technology, the sensor data acquisition executive information platform, relying on advanced networking technology, information collected by various types of devices, using RFID, barcode recognition, video, sensor, GIS, GPS and other advanced the technology of the Internet of things, the completion of the initial data acquisition, real-time tracking and logistics dynamic, timely feedback data, to realize the wisdom of perception preliminary, and the accumulation of the original data for high-level data application.

5.2 Data Layer

The core of the data layer is the use of big data technology for data analysis, and the support layer of the incoming data filtering and storage. The support layer transfers the collected structured data, unstructured data, real-time stream data and other data sources to the data layer. At the same time, through the open interface, access to the relevant information from the enterprise, government, military, financial institutions and other external entities, so that all the data in this together, forming a huge data source, providing a variety of samples for mining, data analysis, in order to ensure the validity of data analysis results. The data exchange technology, cloud computing technology through electronic data, data mining, data warehouse, storage, and use of massive information management, virtualization technology, distributed processing technology, and real-time data stream processing, intelligent analysis technology for large data mining analysis provides strong technical support for rapid [7].

5.3 Function Layer

The function layer is the core function of military logistics ecosystem, including military logistics and military logistics collaborative ecosystem environment and population co military logistics ecosystem data mining, three provide original data sources and analysis methods for the whole system, follow the principles of natural evolution, the mining technology with manual intervention. Let the military logistics ecosystem to an efficient, accurate, green, sharing the direction of development.

5.4 Application Layer

The application layer is an important window of information platform can provide application services to the end user, the application layer from the function layer transfer of data and decision feedback to the user as a solution, provide valuable data and information for the user. It mainly includes the following aspects: tracking and monitoring, vehicle scheduling, intelligent warehousing,

warehouse location, path planning, market forecasting, distribution optimization, decision support, etc., to provide technical support for logistics enterprises and military decision-making.

6. Conclusions and Outlook

In the era of the "Internet of things", "big data" as an important factor of production is the logistics field play its role in promoting, the author from the "big data era background, from the perspective of organizational ecology, using the synergy theory and reveals the synergy relationship between logistics enterprises and the surrounding environment and related enterprise symbiosis theory, clear the direction and power of logistics enterprises. In the logistics ecosystem, collaborative logistics population and the social and economic environment, the natural environment is a prerequisite for the survival and development of logistics enterprises; logistics of different types of populations and the same type of collaborative logistics among populations is the survival and development of logistics enterprises in the logistics group for internal security; individual enterprises collaboration is fundamental the survival and development of logistics enterprises. Therefore, give full play to the "big data" advantage, establish cooperative consciousness, improve the mode of cooperative symbiosis between individual, population and environment, is the key to the logistics ecosystem balance and sustainable development.

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